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(21) International Application Number: PCT/EP97/01446 (22) International Filing Date: 21 March 1997 (21.03.97) (30) Priority Data: 96200837.1 28 March 1996 (28.03.96) EP (34) Countries for which the regional or international application was filed: NL et al. (71) Applicant (for all designated States except US): GIST-BROCADES B.V. [NL/NL]; Wateringseweg 1, P.O. Box 1, NL-2600 MA Delft (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): BIJL, Hendrik, Louis [NL/NL]; Insulindestraat 72, NL-3131 ZD Vlaardingen (NL). SCHAAP, Albert [NL/NL]; Smitshoek 13, NL-2993 BG Barendrecht (NL). VISSER, Johannes, Martinus, Jacobus [NL/NL]; Gangboord 102, NL-3823 TJ Amersfoort (NL). (74) Agents: GOLDIN, Douglas, Michael et al.; J.A. Kemp & Co., 14 South Square, Gray's Inn, London WC1R 5LX (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 22 January 1998 (22.01.98)
(54) Title: PROCESS FOR THE PREPARATION OF A GRANULAR MICROBIAL BIOMASS AND ISOLATION OF VALUABLE COMPOUNDS THEREFROM (57) Abstract A process for the isolation of desired compound(s) from a microbial biomass is disclosed, wherein the microbial biomass (which, if necessary, is pretreated to give a dry matter content of from 25 to 80 %) is granulated (e.g. by extrusion) and then dried to a dry matter content of at least 80 %. The granulation of the biomass to granules significantly eases subsequent drying of the biomass (which can be stored as dried granules) and gives higher yields on extraction of the compound(s).		

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INTERNATIONAL SEARCH REPORT

Intern 1st Application No

PCT/EP 97/01446

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C12N1/12 C12N1/14 C12P7/64 C12N1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C12N C12P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 466 853 A (SIMON ROSEDOWNS LTD) 1974 cited in the application	1-7,30, 34-36
Y	see the whole document ---	8-24
X	FR 2 210 662 A (BRITISH PETROLEUM CO) 12 July 1974 see the whole document ---	1-7,30, 34-36
X	DD 150 627 A (AKADEMIE DER WISSENSCHAFTEN DER DDR) 1981 see the whole document ---	1-7,30, 34-36
X	DE 19 23 529 A (VEBINGENIEURTECHNISCHES ZENTRALBURO MINERALÖLE U. ORGANISCHE GRUNSDTOF) 1969 see the whole document ---	1-7, 34-36
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

28 October 1997

Date of mailing of the international search report

02-12-1997

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 97/01446

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JAREONKITMONGKOL S ET AL: "PRODUCTION OF DIHOMO-GAMMA-LINOLENIC ACID BY A DELTA-5 DESATURASE-DEFECTIVE MUTANT OF MORTIERELLA-ALPINA 1S-4" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, 58 (7). 1992. 2196-2200., XP000676362 see the whole document	8-11, 15-18
Y	JAREONKITMONGKOL S ET AL: "PRODUCTION OF AN EICOSAPENTAENOIC ACID-CONTAINING OIL BY A DELTA-12 DESATURASE-DEFECTIVE MUTANT OF MORTIERELLA-ALPINA 1S-4" JOURNAL OF THE AMERICAN OIL CHEMISTS' SOCIETY, 70 (2). 1993. 119-123., XP000676339 see the whole document	8-11, 15-18
Y	WO 94 29292 A (KRKA TOVARNA ZDRAVIL ;HAJKO PAVICA (SI); VESEL TANJA (SI); RADEZ I) 22 December 1994 see claims 1-8	19,20
Y	WO 93 20183 A (ZEAGEN INC) 14 October 1993 see claims 1-35,71-97	19,20
Y	DATABASE WPI Week 9210 Derwent Publications Ltd., London, GB; AN 92-077323 XP002035614 & JP 04 023 979 A (KOBE STEEL LTD) , 28 January 1992 see abstract	23,24
Y	EP 0 688 871 A (QUEST INT) 27 December 1995 see abstract	21,22
Y	WO 92 12711 A (MARTEK CORP) 6 August 1992 see claims 1-25	12-14
A	WO 91 11918 A (MARTEK CORP) 22 August 1991 see abstract; claims 1-55	34,35
A	EP 0 322 227 A (SUNTORY LTD) 28 June 1989 see the whole document	9-11, 15-18
X	US 4 056 638 A (HUANG HUA-FENG ET AL) 1 November 1977	27,29-32
Y	see abstract; figures 2-5 see column 5, line 58 - column 6, line 5; claim 1; examples 1-4	28

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INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KYLE D J; RATLEDGE C ED.: "Industrial applications of single cell oils."	28
A	1992 , AMERICAN OIL CHEMISTS SOCIETY , CHAMPAIGN XP002044902 see page 61; figures 5-14 -----	10,15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP 97/ 01446

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See annex

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
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Remark on Protest

- ☒ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Invention 1: claims 1-26 , 34-36

processes for the isolation of compounds from a microbial biomass ,the process comprising obtaining a biomass with a dry matter content from 25%-80% , granulating these particles with a dry matter content from 25%-80% , drying the the granules to a dry matter content of at least 80% , purification , extraction or isolation of the compound and use of the extracted compounds in food or cosmetic/pharmaceutical compositions .

Invention 2: claims 27-33

Microbial extrudates or microbial biomass granular compositions having an average of 30-70% dry matter- or at least 80% dry matter

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 97/01446

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